



# ICAO ENGINE nvPM EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: PW1127G1-JM BYPASS RATIO (-): 12.3  
 UNIQUE ID NUMBER: 01P18PW151 PRESSURE RATIO  $\pi_{co}$  (-): 31.7  
 COMBUSTOR: TALON X, Block-C  
 ENGINE TYPE: TF RATED OUTPUT  $F_{co}$  (kN): 120.4

### REGULATORY DATA

| CHARACTERISTIC VALUES:                     | $LTO_{mass}/F_{co}$<br>(mg/kN) | $LTO_{num}/F_{co}$<br>(particles/kN) | NVPM MASS CONCENTRATION<br>( $\mu\text{g}/\text{m}^3$ ) |
|--|--------------------------------|--------------------------------------|---|
| LTO/ $F_{co}$ AND MAX nvPM <sub>mass</sub> | 74.6                           | 2.50E+15                             | 1857  |
| AS % OF CAEP/10 LIMIT                      | -                              | -                                    | 30.8  |
| AS % OF CAEP/11 LIMIT (InP)                | 3.6                            | 19.0                                 |   |
| AS % OF CAEP/11 LIMIT (NT)                 | 17.8                           | 48.4                                 |   |

### MEASURED DATA

| MODE  | POWER SETTING<br>(% $F_{co}$ ) | TIME<br>minutes | FUEL FLOW<br>kg/s | EMISSIONS INDICES*            |                                     | NVPM MASS CONCENTRATION<br>PEAK nvPM <sub>mass</sub><br>( $\mu\text{g}/\text{m}^3$ ) |
|---|--------------------------------|-----------------|-------------------|-------------------------------|-------------------------------------|--|
|   |                                |                 |                   | EI <sub>mass</sub><br>(mg/kg) | EI <sub>num</sub><br>(particles/kg) |  |
| TAKE-OFF  | 100                            | 0.7             | 0.800             | 62.8                          | 9.43E+14                            |  |
| CLIMB OUT   | 85                             | 2.2             | 0.670             | 32.1                          | 6.77E+14                            |  |
| APPROACH  | 30                             | 4.0             | 0.232             | 6.4                           | 3.71E+14                            |  |
| IDLE  | 7                              | 26.0            | 0.080             | 9.3                           | 8.37E+14                            |  |
| LTO TOTAL (kg, mg, number of particles)   |                                |                 | 303               | 6464                          | 2.17E+17                            | -  |
| NUMBER OF ENGINES   |                                |                 |                   | 1                             | 1                                   | 1  |
| NUMBER OF TESTS   |                                |                 |                   | 3                             | 3                                   | 3  |
| AVERAGE LTO/ $F_{co}$ VALUES (mg/kN, particles/kN)                                  |                                |                 |                   | 53.7                          | 1.80E+15                            | -  |
| MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ( $\mu\text{g}/\text{m}^3$ ) |                                |                 |                   | 62.8                          | 9.50E+14                            | 1442   |

\* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

### DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

| MODE      | POWER SETTING<br>(% $F_{co}$ ) | CORRECTED EMISSIONS INDICES      |  |
|-----------|--------------------------------|----------------------------------|--|
|           |                                | EI <sub>mass_SL</sub><br>(mg/kg) | EI <sub>num_SL</sub><br>(particles/kg) |
| TAKE-OFF  | 100                            | 79.0                             | 3.71E+15                               |
| CLIMB OUT | 85                             | 42.4                             | 2.91E+15                               |
| APPROACH  | 30                             | 9.4                              | 2.90E+15                               |
| IDLE      | 7                              | 18.6                             | 8.20E+15                               |

### AMBIENT CONDITIONS

|                                | From            |        | To                            |                            |
|--------------------------------|-----------------|--------|-------------------------------|----------------------------|
|                                | BAROMETER (kPa) | 100.8  | 103.0                         | HEAT OF COMBUSTION (MJ/kg) |
| TEMPERATURE (K)                | 266.7           | 277.2  | HYDROGEN CONTENT (%mass)      | 13.84                      |
| HUMIDITY (kg water/kg dry air) | 0.0004          | 0.0017 | AROMATICS CONTENT (%vol)      | 15.3                       |
|                                |                 |        | NAPHTHALENE CONTENT(%vol)     | 1.87                       |
|                                |                 |        | SULPHUR CONTENT (ppm by mass) | 705                        |

MANUFACTURER: Pratt & Whitney  
 TEST ORGANIZATION: Pratt & Whitney  
 TEST LOCATION: East Hartford, CT  
 TEST DATES: 02/03/2017-04/03/2017

### REMARKS

1. Data from certification report PWA-12243
2. 1 engine tested
3. TALON-X, Block-C\* combustor
4. Certification in accordance with ICAO Annex 16 Vol. II., Part III, Chapter 2.
5. nvPM levels in accordance with ICAO Annex 16 Vol. II, Part III, Chapter 4 and Appendices 7 and 8. (CAEP/10)